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ENERGY IN THE FUTURE

PROFESSOR F. E. SIMON, of the Clarendon Laboratory, Oxford, in an address to the North Western Fuel Luncheon Club on the long term prospects of energy supply, expressed the opinion that the general pattern of energy distribution will not change. For a very long time there would be a demand for electricity as well as for liquid fuel for transport. Even if coal is exhausted in this country there are sources of energy in other parts of the Commonwealth. Energy we must have, and the price is not too important when compared with what we spend on drink and tobacco. We waste more energy in domestic heating alone than India uses altogether. There is a popular belief that power sources are scarce, yet as much energy is intercepted from the sun in 10 minutes as is used in the whole world in a year. That energy is converted into plant growth, the motion of the wind, and waves, but most directly into heat. Indirect sources of energy are the differential temperatures of the sea and soil and of course nuclear energy. These all add up to an enormous amount. The really important question is not to find new sources of energy but to find out how they can be harnessed economically.

It is largely a question of concentration. We are asked why we do not harness the waves. But the most simple equation shows that the area which would need to be covered with machinery, and the machinery itself, would be prohibitively big. In special circumstances 'these more fancy power sources' could be used. Volcanic heat might be used to produce power but there are great difficulties.

The only two sources which remain for serious discussion for large scale power production are nuclear energy and solar energy. Professor Simon discussed briefly the methods at present developed for the use of uranium in the reactor pile. There were so many uncertainties that it was *dangerous nonsense* to say that nuclear energy is likely to be available in the immediate future for industrial power supply. Perhaps by the end of the century it may begin to contribute noticeably to our demand for energy.

Solar energy is about in the same position—small plant running at low efficiency. Progress may be slower than in nuclear energy because of the absence of the ulterior motive of military uses but in the long run solar energy may become very much more important. The most hopeful way would be to use growing plants. At present efficiency is not very high, but if the carbon dioxide content of the atmosphere in which growth takes place is increased and the concentration of nutrient is stepped up the efficiency can be greatly increased. It is, said Professor Simon, important to realise that the present power crisis has nothing to do with the exhaustion of conventional sources. We have coal for 200 years, 'the U.S.A. and Russia have many thousands of years at the present rate of consumption.' The time scale may be relatively long but it is not too early to start to do something. We must press on with science and technology if we are to maintain in this country a decent standard of living.

And that brought Professor Simon to perhaps the most significant passage in his address—the question whether we are using scientific and technological manpower properly and whether we have enough. The ratio of teachers in arts and science is two to one in this country as against one to two in other countries. On the use of existing scientists he estimates that a laboratory needs the expenditure of £1,000 per year per research scientist, otherwise first class brains are not fully used. He believes that in most laboratories this figure is not reached by a long way. He thinks we are spending too much money on nuclear physics, and that the enormous sums expended are not being properly utilised, to the neglect of other fields of research which are just as important.

Just now we were at a dangerous point because policy is tending to economise on science and development. In the distant future there is no need to worry about energy supply. In the near future it is a political question. Present forms of fuel must be conserved. Future developments must be initiated if we are to keep or to recover our place among the leading nations of the world. But most important is a right policy, a proper balance between different lines of research and between fundamental and applied research. 'The scientific community has not enough power to put pressure on government—and governments only do things under pressure. It is up to industry to exert this pressure. It is industry which will suffer most directly from a neglect of science.'

FREEDOM OF CHOICE

MR. GEOFFREY LLOYD has continued the very commendable practice introduced by his predecessor in office as Minister of Fuel and Power of holding periodical meetings with the chairmen of the 12 gas consultative councils. Unlike the heads of the area boards who constitute the Gas Council, the chairmen of the consultative councils have no officially constituted clearing house, but the meetings which the Minister has held over the past two years have enabled them to pool their experiences and to help each other towards a solution of their common problems. They have gone far beyond the initial idea of promoting publicity for the objects of the councils. Our own view, which we are not quite sure is shared unanimously by the chairmen, is that it would be altogether helpful if reports of these periodical meetings were made freely available, at any rate to the technical Press. For the present the proceedings are recorded in a confidential communication but the brief passages mentioned by Alderman Turner at the March meeting of the Eastern Council served to indicate the ground covered and to arouse among members a desire for general circulation of the report. The question at once arose as to whether, if the report became a public document, it would become less informative by reason of the withholding of passages on which the Ministry might be less desirous of public comment.

One point on which the council chairmen are unanimous is the importance of giving the tenants of council houses as complete freedom of choice between gas and electricity as is enjoyed by other people. Such freedom of choice can be given only if gas and electricity are made available. If electricity only is installed the price may advance by adjustment of tariffs, in which case the consumer may be in a difficult position; moreover, if gas is not installed at the time a new estate is laid out and before roads are made and houses are completed there is much less likelihood of gas being made available afterwards.

As an editorial in the *Electrical Review* of March 14 rightly pointed out, the choice between gas and electrical equipment in the home before the war was largely a matter for the individual householder, but now that most house building is in the hands of the local authorities the position is different. One decision may settle the kind of service to be provided throughout an entire estate, and even if tenants are later allowed to change this will generally be at their own cost, whereas existing appliances will be free. We need not here dilate on the respective merits of gas and electricity; in our view both are essential in every home. So far as maintenance is concerned the advantage is inherently with gas, but if only one service is to be installed electricity has an advantage over gas in that it alone can fulfil—at a price—all domestic needs. Having referred to a recent case in which the cost of repairs factor influenced a council to equip a large estate for gas, the *Electrical Review* says: 'Why not provide an adequate number of points, both gas and electric, and let the tenants bear the responsibility of providing the equipment of their choice perhaps assisted by the electricity and gas authorities? In the days of the kitchen range and the built-in copper these had of necessity to be considered as part of the house, but this does not apply with the more mobile gas and electrical equipment of today.' Local authorities concerned to cut down costs wherever practicable may be attracted by the suggestion but 'freedom of choice' would be restricted to the very limited spending power of the council house tenant who, having furnished his house, would have little money left for cooking, heating, water heating, and lighting appliances. It seems to us that the council should provide reasonable standard equipment in return for inclusive rentals and that tenants should be asked to bear the responsibility of providing equipment of their choice only in excess of the council's standard.

AND THE NEXT, PLEASE

THE success of the Gas Service Conference—and who can deny that it was a success?—encourages one to look forward to the next one. Should it follow the pattern of the first or should it break new ground? These and other similar questions must be decided, but before straying too far along the path of speculation it is fitting that we should consider those on whom so much of the success of the last conference depended. In these columns last week we paid tribute to the energetic efforts of Mr. R. J. Gregg and Mr. W. D. Elson, and we recorded the reference made by Colonel H. C. Smith, Chairman of the Gas Council, to the work of Mr. C. Warrenne, Exhibitions Officer to the Council, who was responsible for the attractive exhibition which was an important complement to the conference, and for the other display features which gave the event such an air of good stage management. And the Commercial Managers' Committee must also be mentioned, for the question of a sales conference was discussed at their very first meeting, on July 20, 1950, and it was from their number that an *ad hoc* committee was subsequently formed to plan what shape the conference should take. Their recommendations were approved by the Gas Council at the end of 1950, and so the difficult job of designing this three-day function got under way. These are some of the people the two thousand and more delegates must thank for a stimulating conference, and some of the people to whom they must look for future moves. We hope the sun will shine on their efforts, because there is plenty of room in the industry for so inspiring an incentive to sales staffs and such a refreshing blossom from the supposedly barren soil of nationalisation.

OUR PHOTOGRAPHIC DEPARTMENT

It would be unjust to allow to go unnoticed our Photographic Department's new brochure. Indeed, it would be difficult for it to do so, as it is of startling appearance and good production. It is good to see one's youngest daughter branching out and continuing, in another field, the service to the gas industry which we proudly claim for 104 years. The Department's method seems sound. Its members propose travelling all over the country, taking with them their specialised knowledge and technique and saving the industry and contractors heavy charges for travelling. Their order book is full, so we have taken the precaution to book them for Institution Week already.

PLANT ENGINEERS' CONFERENCE

The scope of the works engineer will be the theme of the fifth national conference of the Incorporated Plant Engineers at the Grand Hotel, Harrogate, on May 21, 22 and 23. The works engineer has been described as 'the man who keeps the wheels of industry turning,' but that is much too simple an interpretation of his responsibility and his scope. He is expected to be a mechanical, civil, electrical, heating, refrigeration, water, gas, and steam engineer; he must be something of an architect, an economist, a chemist, draughtsman, metallurgist, and often (it seems) a magician. Mr. G. A. Rooley, President-designate for 1952-53, will take as the subject of his Presidential Address 'The Plant Engineer and Production Costs.' Mr. D. Holland, Chief Works Engineer of Serck Radiators, Ltd., will give a paper on 'The Functions and Responsibilities of the Works Engineer,' and Mr. A. Whittick, Editor of the *Muck Shifter and Public Works Digest* will deal with 'The Civil Engineering Programme and the Machines for the Work.' Established in 1946 the Incorporated Plant Engineers have a membership of 2,300, with 16 branches in the United Kingdom and two overseas. An education scheme has been prepared in collaboration with the technical college authorities, and refresher courses for works and plant engineers, organised by the institution, are an established feature of adult education.

SOLID FUEL DOMESTIC HEATING

Present-day problems of domestic heating were reviewed by Sir Charles Ellis, Scientific Member of the National Coal Board, in an address to the annual conference of the Women's Advisory Council on Solid Fuel in London on March 20. In his view too many housewives treat stoves with a lack of appreciation and knowledge, which is in striking contrast to their skill and interest in other branches of household management. Few housewives know what they are doing when they try to adjust the draught or fire-bed of their stoves, he said. Most houses must continue for many years to come to be heated with open fires, Sir Charles pointed out, but the open fire need not be inefficient, and with its radiant heat it had a valuable contribution to make to our humid and variable climate. There was no reason why chimneys should be just gaping holes for providing a draught. The modern compromise between a closed and open stove was essentially a recognition that the room and stove must be looked at as a unit. An overall efficiency of more than 35% could be obtained, coupled with a high standard of comfort from a reduction in draughts. Scientists, he said, had shown the way and it was now for women's organisations to create the demand and for manufacturers to use their skill and knowledge to see that the demand was satisfied. A manufacturer of one of the new type of fires said it was possible today to produce in mass a cheap and efficient appliance of the type visualised by Sir Charles, but it was 'very ugly.' If the housewife wanted efficiency she would have to be prepared to put up with a smaller fireplace opening.

Letters to the Editor

REMOVAL OF DEPOSITS FROM GAS CONDENSERS

Dear Sir,—May I be allowed to use your correspondence columns to elicit information from your readers on this subject? The cost of providing effective means for the removal of deposits from the outer surfaces of the water tubes in gas condensers is greater than at first sight might appear, as not only must sprays or flushing compartments be provided, but with vertical tube condensers the tube pitching must usually be opened out in order to insert the flushing means; this will result in the enlargement of the condenser casing and often in an increased number of gas passes. It may also necessitate the provision of overhead tanks and/or pumps, valves, and connections, for supplying the flushing medium to the condenser. The several items mentioned add considerably to the capital cost.

Of course, if the deposits are known to be volatile or tar-soluble, means other than flushing may be adopted—*e.g.*, arrangements for the reversal of gas and water flows, or more simply, the provision of steaming points. However, both entail considerable additional cost. Reversing connections and valves are expensive, while if a condenser is to be frequently steamed a standby unit must be provided.

We have recently made a survey of the subject but the reports we have received are conflicting. At some works routine flushing is practised more to guard against the possibility of accumulation of deposits than because of any indication of rising back-pressure or outlet gas temperature. At other works treating similar types of gas, the condensers are never flushed or otherwise cleaned. There is yet a third group where periodic flushing is essential to avoid excessive back-pressure. The information so far collected and our preliminary views on the matter may be summarised as follows:

(1) Very few condensers treating continuous vertical retort gas require means for cleaning the outer surface of the tubes, and generally it would appear unnecessary to make any special provisions, although there may be occasional exceptions.

(2) All condensers treating coke oven gas must be provided with means for the removal of naphthalene deposits.

(3) Surprisingly enough, by no means all condensers treating horizontal retort gas require periodic cleaning, but it would probably be considered unsafe not to make the necessary provisions.

(4) Carburetted water gas condensers generally seem to give little trouble, but again provision should probably be made. (Or could this be confined to cases where it is known that the carburetting oil will be saturated with naphthalene, or on old manually-operated plants where naphthalene troubles are known to be present?).

(5) Intermittent vertical retort and chamber gas usually appears to be free from heavy naphthalene concentrations, but, as with all types of gas, much depends upon the coal, the carbonising plant, and the operating conditions. Could means for flushing, etc., be safely omitted?

If there is an existing carbonising plant and the condensers merely require augmenting, there is, of course, no problem. The engineer will be able to specify his requirements based on his experience. It is when new plant is being installed that difficulties may arise. If trouble *is* experienced, then means for its elimination will be urgently necessary; but should all condensers be burdened with the additional cost of these means when only the odd one is liable to give trouble? If with any particular type of gas the risk of trouble is 5% or more, then in our opinion all should certainly be provided with the necessary facilities; but if the risk is less, what then?

Finally, steaming or reversing will only provide a cure for volatile or tar-soluble deposits of the naphthalene group. Is the incidence of other deposits (*e.g.*, pitch, dust, inorganic salts, etc.) appreciable? Your readers' views on these questions would be of real benefit to the industry and its contractors.

Yours faithfully,

K. W. FRANCOMBE.

Whessoe, Ltd., Darlington.
March 13, 1952.

AUTOMATIC CONTROL OF C.V.

DEAR SIR,—I read with interest the article on the automatic control of calorific value by Messrs. J. R. Kenward and T. A. Lucas in the *Gas Journal* of February 6 and also that by Mr. J. W. Young, of Lurgan, commenting on the same subject in the *Journal* of March 5. The various authors have dealt with a subject which must be of considerable interest to the gas industry, for a steady calorific value is the first requirement in the distribution of gas.

We have in the first paper the approach to the question from the large works point of view, and in the second contribution much practical information applicable to the large and in particular the smaller undertakings which have not the staff to undertake constant technical supervision of production.

Much can be done with very simple and inexpensive apparatus to make the hand control of calorific value a very easy matter, and the methods I use are no more than an application of elementary principles.

The plant in my works, making approximately 50 mill. cu.ft. per year, consists of four settings of six stop-end horizontal retorts, hand charged, and operating dry with Cort's anti-dips. No retort house governor is used or required, but the exhauster compensator governor carries a patent relay governing attachment which gives control at the hydraulics to the order of plus or minus $\frac{1}{100}$ in. W.G. Thus, this governing can be classed as A1. Producer gas for more technically correct blending is not yet available, but such a plant is now being installed. Alterations to calorific value have to be made by regulation of vacuum. The relay pilot is situated in the retort house for ease in adjustment.

Make calorific value is ultimately checked by a Sigma calorimeter operating on the outlet of the main stream from the purifiers. A make sampling exhauster is fitted in the retort house and exhausts a continuous sample of crude gas from the foul main, passing the sample through a washer only for some control of tar fog, and thence to a flat-flame burner. The layout gives a time lag of under 30 sec. and the state or tendency of the make to vary is noticeable by the altered degree of luminosity of the unstripped flame. With a little practice estimates of calorific value can be made easily to within 5%, and the rapidity with which variations are apparent allows of immediate correction by alteration to the relay controlled vacuum.

I have found that the closer regulation of vacuum and avoidance of over-correction, which is a very common human failing and particularly applicable to a gas stoker, do give an enhanced thermal yield.

It may be argued that a flat-flame burner is a quite unscientific measuring device. Perhaps it is; but, I confidently add, try it for yourself! Properly applied, you will be surprised.

A typical routine of control is as follows:—

The stoker observes Sigma to establish true calorific value position on past working. The flat-flame may suggest the necessity for vacuum adjustment, which can be done, and the results observed within 30 sec. A little more adjustment may be required, perhaps several adjustments within a period of 2 min.

Perhaps your judgment is 5% out. Never mind. At least you are not working blind, during which time the calorific value could actually have varied to a much greater degree.

Some 30-40 min. later the gas reaches the Sigma, and then you know the accuracy of your guess.

Contrast this method with practices which are far from uncommon in the gas industry, an example being a works having test apparatus fed from the outlet of the main purifiers. In effect there may be long periods of blind working during which it can only be hoped that the last correction applied was substantially correct.

More than likely over-correction is applied both for high and low calorific value swings, leading to further hunting; and this does not promote smooth working, absence of choked ascension pipes, unvarying calorific values on the district, nor, indeed, does it give the greatest thermal yield.

Yours faithfully,

T. F. HASTINGS.

Gas Department,
Omagh.
March 18, 1952.

Obituary

Lady Milne-Watson, widow of Sir David Milne-Watson, first Baronet, Governor of the Gas Light and Coke Company, who died in 1945, and mother of Mr. Michael Milne-Watson, Chairman of the North Thames Gas Board, died at Hove on March 20, aged 81.

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Mrs. A. McDonald, wife of Mr. A. McDonald, B.SC., A.R.T.C., A.M.INST.GAS E., Member, North Eastern Gas Board, died at her home at Harrogate on March 20. Mrs. McDonald, who was very well known in gas industry circles in Scotland and Yorkshire, was an Hon. Member of the Harrogate Women's Gas Development Association.

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Mr. William Scotland, Manager and Engineer of the Bangor (Co. Down) gas undertaking, has died. Mr. Scotland entered the Bangor gasworks as an apprentice in 1905 and rose to be assistant manager under Mr. Barker Mitchell. On Mr. Mitchell's retirement on April 1, 1939, he succeeded him as Manager and Engineer. He is survived by his wife and three sons.

Diary

Mar. 27.—North Thames G.C.C.: Westminster City Hall, Charing Cross Road. 2.30 p.m.

Mar. 28.—Wales Juniors (North): Inspection of new Tully plant, Caernarvon. Paper by D. J. Turner.

Mar. 29.—Yorkshire Juniors: 'Cause and Dispersion of Water Gas Tar Emulsions,' R. O. Bambrough; 'An Unusual Repair to a 4½ Mill. Cu.Ft. Gasholder,' R. Pestell; 'Industrial Research and Development,' A. R. Wilson. At Harrogate.

Mar. 31.—West Midlands G.C.C.: Room 178, Queen's Hotel, Birmingham, 2.30 p.m.

April 1.—South Eastern G.C.C.: Caxton Hall (Tudor Room), Westminster. 2.15 p.m.

April 1.—Institute of Cost and Works Accountants: 'Accountancy of Changing Price Levels,' M. Francois M. Richard; Beaver Hall, Little Trinity Lane, E.C.4, 5.15 p.m. Tickets (free) from the Director, 63, Portland Place, W.1.

April 2.—Manchester Juniors: 'Accountancy and Technical Control,' W. Farthing (Deputy Accountant, Manchester Group).

April 3.—Midland Juniors: Half day visit to C and W. Walker, Ltd., Donnington.

April 4.—North of England Section, I.G.E.: Spring Meeting at Sunderland.

April 4.—London and Southern Juniors: 'Any Questions,' to be answered by a panel of members representing the manufacturing, distribution, and utilisation sides of the gas industry. 178, Edgware Road, 6.30 p.m.

April 9.—Scottish G.C.C.: Edinburgh.

April 9.—Yorkshire and Manchester Juniors: Joint meeting. Visit to the Leeds production centre of Radiation Ltd.

April 12.—Scottish Juniors (Eastern): Paper by R. H. Foston (Perth).

Substantial All-Round North Western Increases

REVISED gas tariffs which will increase the cost of gas to all classes of consumers throughout the area were announced on March 20 to the North Western Gas Consultative Council by Mr. D. P. Welman, Chairman of the North Western Gas Board. The Council approved the increases. The new tariffs have been necessitated by advances in the cost of coal, transport, wages and other charges, which, after taking account of improved efficiencies in production and distribution, have added more than £2 mill. to the Board's operating costs in the past year. The price structure represents a further step towards greater equity of treatment. The basis is a standard thermal block in which the price per therm charged at each stage of the block is progressively reduced to a minimum price equivalent to just over the net cost of manufacture. Seven tariffs based on this standard block are applied to different parts of the area. They become applicable as from the first meter reading after March 31. The seven tariffs are as follows:—

Block		Seven Price Ranges						
		1	2	3	4	5	6	7
		d.	d.	d.	d.	d.	d.	d.
First 65 therms	...	16.0	16.5	17.0	17.5	18.0	19.0	20.0
Next 1,235 ,,	...	14.0	14.5	15.0	15.5	16.0	17.0	18.0
,, 2,300 ,,	...	13.0	13.5	14.0	14.5	15.0	16.0	17.0
,, 7,650 ,,	...	11.0	11.5	12.0	12.5	13.0	14.0	15.0
,, 33,750 ,,	...	10.5	11.0	11.5	12.0	12.5	13.5	14.5
,, 45,000 ,,	...	10.0	10.5	11.0	11.5	12.0	13.0	14.0
Over 90,000 ,,	...	9.5	9.5	9.5	10.0	10.5	11.5	12.5

The first block, 65 therms per quarter, embraces virtually all domestic consumers, and the average increase for these consumers is around 2d. per therm. No change is being made in domestic metering and supplementary charges. All gas supplied for public lighting throughout the area will be subject to an increase of 2d. per therm from 9½d. to 11½d.

The new increases will provide an additional revenue of about £2,409,000 in a full year, and £1,937,000 will be received in 1952-3.

When deciding on the increases the Board took the opportunity of further standardising tariffs—ultimately it is hoped to have one tariff for the whole of the area.

Explaining the increase, Mr. Welman said: 'It is not for me to criticise the Coal Board and I do not wish to do so, but I should be easier in my mind if I knew if the Coal Board would tell us how they frame their tariff structure. We should then know the basis on which we are paying for coal. Do you believe it is right in an industry such as ours which makes the fullest possible use of this country's one source of real national wealth that we should be paying the highest price for it? The proper course is that we, as an industry, making the best possible use of our coal resources on the widest possible scale, should be charged the lowest reasonable price for it and not subsidise, directly or indirectly, the inefficient user of coal by any other method.'

The Board regretted it had not yet been able to introduce an alternative two-part tariff for domestic consumers throughout the area. This had been promised when the prices were last increased a year ago. Then it had hoped to be able to design such a tariff for operation throughout the area within 18 months. The incidence of rapidly rising costs had made it difficult yet to establish a satisfactory basis for such a tariff but it was still the Board's intention to introduce one as soon as possible.

Mr. Welman gave a warning that since the present increases were decided upon the Board was faced with a further increase of £45,000 due to the 7½d. a gal. increase in the price of petrol, together with a further £187,500 for increased interest charges.

Judgment Against Board

REMARKING that the case was one of great complexity, Mr. Justice Vaisey, in the Chancery Division on March 13, gave his reserved judgment on a summons concerning the Morley Gas Company. The summons was brought by Mr. John Michael Whittington, representing the interests of stockholders in the Morley Gas Company under the Gas Act, 1948, against the North Eastern Gas Board, in whom the undertaking of the Company is now vested.

Mr. Whittington asked whether or not, upon the true construction of the Act, he ought to make to the ordinary stockholders, out of the moneys which might be payable to him by the Gas Board, any payment in respect of £1,388 16s. 10d. standing to the credit of the Company's reserve fund, or any payment calculated in accordance with Section 73 of the Morley Gas Order, 1940, for the final financial period of the Company before nationalisation on May 1, 1949.

Mr. Justice Vaisey said the case had been extremely well argued and a transcript was on record in case the matter was carried to a higher court. He proposed therefore to do little more than to say that the conclusions he had reached were those submitted on behalf of Mr. Whittington, who, in his judgment, ought to make both payments. The second of them was, he understood, that which was described in the Order as the 'stockholders' portion.'

Mr. Whittington was awarded costs against the Board.

HOTELYMPIA GOES NORTH

Newcastle Hotel and Catering Exhibition

AS a service to its commercial, industrial, and institutional catering consumers, many of whom might not have found it convenient to visit the national exhibition in London, the Northern Gas Board sponsored this month an Hotel and Catering Exhibition at its Divisional Headquarters in Newcastle.

A comprehensive selection of the latest equipment for cooking, dish-washing and hot water service—much of which had been transferred direct from Hotelympia—was exhibited, in addition to a bureau set up for the provision of technical advice on all aspects of kitchen planning and lay-out, together with specialised daily demonstrations. Care was taken in the selection of the equipment to cover the varying needs of caterers from the simple unit required to serve the smallest guest-house or snack bar to complete large scale installations for hotels, hospitals or canteens, stress being laid on the design and construction of equipment and its flexibility in use.

The main entrance hall contained the section devoted to kitchen planning, and the plans of suggested lay-outs with enlarged photographs of actual installations displayed were backed by specialist advice on the planning of all sizes and types of kitchen. Over 35 major catering appliances were exhibited in the demonstration theatre and display annexe, including two 4-oven ranges, one with bainmarie, and visitors had the opportunity of comparing designs by several of the leading manufacturers. A semi-automatic dish-washing and sterilising machine installation was exhibited, together with commercial water heating and space heating equipment; and special displays dealing exclusively with commercial catering were arranged in the four showroom windows during the period of the exhibition.

Demonstrations of recipes and techniques for a variety of confectionery and other items of particular interest to the catering trades were given each afternoon by a member of the research bakery staff of a firm of national repute. A single oven range and a deep fat fryer were used for these demonstrations which proved of very great interest, as shown for example by a reply paid telegram, from as far afield as Westmorland, requesting details of the demonstration to be given on a particular afternoon.

The interest aroused by the exhibition and the immediate results have been most gratifying and consideration is being given to the holding of an annual event of this nature.

IN PARLIAMENT

South Eastern Board Offices

WHEN Sir HERBERT WILLIAMS (Croydon, East) asked the Minister of Fuel and Power last December a question regarding reconstruction work at the South Eastern Gas Board's offices at Croydon, Mr. GEOFFREY LLOYD said that while he could not comment on an authorisation made some time ago he could, of course, make some enquiries.

On March 10, Sir HERBERT WILLIAMS re-opened the subject by asking the Minister what sum had been authorised by him for expenditure by the Board and how much they had actually spent.

Mr. LLOYD stated that the authorisations granted covered an estimated total cost of £37,707. Matters of some legal difficulty arose in this case, he added, and in accordance with arrangements he had made following the Scarcroft enquiry to refer matters of this kind to the Director of Public Prosecutions when they arose, he had done so in this case.

Palace of Westminster: Fuel Consumption

Mr. GERALD NABARRO (Kidderminster) contends that in coal conservation and fuel efficiency the House should set an example; and on March 11 he asked the Minister of Works if he was looking to his boilers and his steam raisers. What, enquired Mr. Nabarro, was the current annual rate of coal consumption of the Palace of Westminster, including the coal equivalent for gas and electricity consumed in the buildings and precincts of the Palace; how did the figure compare with earlier years; and what steps were in hand to improve heat, light, and power arrangements with a view to coal conservation and efficient utilisation?

Mr. DAVID ECCLES replied that the total consumption of coal and the equivalent in coal of gas and electricity and fuel oil in 1951 was 4,771 tons. This compared with an average of 2,849 tons for the five years before the new boiler house came into use in 1950. The increased consumption was due to the additional accommodation and amenities, mostly in the new House of Commons. The domestic hot water system, added the Minister, would shortly be connected to the new plant, and the separate boiler closed down. Insulation of steam and hot water pipes was nearly complete, and these measures should result in increased efficiency. The working of the system would be carefully watched to ensure all practicable economies.

Fuel and Power Industries' Reports

In the course of discussion on the business of the House for the following week Mr. NABARRO asked the Leader of the House on March 13 if his attention had been drawn to the fact that there were now arrears of debates for no fewer than six annual reports and accounts of the nationalised fuel and power industries, and that within eight weeks those arrears would become nine. Could he say when Parliamentary time would be found for the discussion of any, or all, of these reports?

Mr. HARRY CROOKSHANK said he could not. Nor could he accept the word 'arrears' in this connection; but if there was a general desire that these matters should be discussed, no doubt it could be raised through the usual channels. But in the immediate future Parliamentary time was very congested.

Mr. PHILIP NOEL-BAKER (Derby, South) said he was sure Mr. Crookshank recognised, as did the House, how desirable it was that these reports should be debated. Did he realise that they had never yet had a debate on the gas industry since it was nationalised? The last Government decided that some Government days should be given for this purpose. Could the present Government do that too?

Mr. CROOKSHANK: Not without notice.

Mr. HERBERT MORRISON (Lewisham, South) recalled that the Labour Government had undertaken that there should be not fewer than three days, apart from certain other occasions, on which the House should discuss the nationalised industries. Now they were finding resistance.

Mr. CROOKSHANK: I really cannot accept that. Mr. Morrison has no right to say he is getting resistance because we are discussing at the moment the business for next week. These wider issues are generally raised through the usual channels so that discussion on them can take place to see how matters can be fitted in to the general advantage. I have not said that there will not be any days at all. I said only that, without notice, I could not say how many there would be or when they would be. After all, the Parliamentary Session is not quite over yet.

The Fireguards Bill

The private Member's Bill to prevent the sale of gas and electric fires and oil stoves unless fitted with an adequate guard, introduced by Mr. DENYS BULLARD (Norfolk, South-West) was read a second time on March 14 without a division. For a measure which the seconder (Mr. GERALD NABARRO) described as modest in scope it speaks much for the wide public interest, and concern, in the subject that the debate in the Commons should have occupied all but five hours.

The aim of the Bill, explained Mr. BULLARD, was to prevent the large number of accidents from burning which occur in the home. He knew that guards involved adding to the cost of the fire. That extra cost, however, was not very great—it might be anything from a few shillings up to £1 in the case of electric fires. The amount of metal required was also very small. The gas and electricity industries were most anxious to co-operate in this matter at all times, he added.

Mr. NABARRO spoke from painful personal experience. In a moment of complete preoccupation a few weeks ago, while he was dictating a particularly warm note to (appropriately enough) the Ministry of Fuel and Power, he stood, jacket raised in typical masculine attitude, warming his rear portions in front of an electric fire in his office—when the back of his jacket caught fire and was badly burned. As a grown-up he was easily able to cope with that anxious moment (perhaps the Member for Kidderminster was that other kind of fireguard during the war), but a child would not have been similarly placed. This Bill was important because it should be regarded as the precursor of similar measures which, in the next few years, he hoped would extend similar safety regulations and provisions to all fires, of whatever character, that are installed in our homes.

On this point, Mr. GERALD WILLIAMS (Tonbridge) reminded the House that an Englishman's home is his castle and he should be free to look after himself there, whereupon Mr. M. TURNER-SAMUELS (Gloucester) asked Mr. Williams what good was a castle if it was burnt down.

Mr. NABARRO went on to say that in 1953, which would probably be the first full year of the Bill's operation, it was estimated that some 450,000 electric fires (in spite of certain comments on the subject which have recently had some publicity) and 160,000 gas fires would be put in circulation, which would require 102 tons of metal—an infinitesimal proportion of our national production.

Support from All

Support for the Bill came from all parts of the House and was accompanied by many harrowing details of burning accidents which showed more clearly than anything else that a measure of this nature is long overdue. Mr. SOMERVILLE HASTINGS (Barking) regarded the electric panel fire, which is higher than the ordinary fire and has no chimney, as the most dangerous type, and it was most important that it should always be fitted with a guard. The objection had been raised that wire guards detracted from the efficiency of a fire by absorbing heat. Presuming that the guards were of metal, which readily conducts heat, it was difficult to understand that. It might be that a small quantity of heat might be changed from one type of radiation to another, but it seemed to him that all the heat of the fire must in one way or another warm the house whether a guard was used or not.

Mr. WILLIAMS took up this point by quoting expert opinion that heat would be lost by at least 5%; and if they were going to lose 5% from all electric fires it would work out at a very great deal of coal.

Mr. TURNER-SAMUELS intervened at a later stage with the criticism that the Bill left out altogether the question of

safeguarding the open fire, which Dr. Colebrook had described as 'the outstanding hazard of the English home.' He considered that the Home Office should close this serious gap. The Joint Under Secretary of State for the Home Department (Sir HUGH LUCAS-TOOTH) rose to defend this allegedly *laissez faire* attitude of his Department by asking Mr. Turner-Samuels how he proposed dealing with this problem—short of official inspections in private homes. Mr. RONALD BELL (Bucks, South) observed that under this Bill it was not proposed to go into peoples' houses to see how their appliances were protected. They went, as they should do, to the commercial point to see that the appliances were sold in a proper condition. No right of entry was conferred by the Bill—but merely a right of inspection. Not only was the local authority inspector not in a position to go into people's houses, but he could not even go into a shop or factory. The enforcement of the Bill was therefore, to some extent, based on consent.

After a short digression on the greater comfort but lesser safety of flannelette nightgowns as compared with the modern pyjamas, Sir WILLIAM DARLING (Edinburgh, South) reminded the House of the importance of the proper fitting of the guard. A metal guard might itself become very hot, if not red-hot. This matter should be left to the manufacturers.

Mr. CHARLES IAN ORR-EWING (Hendon, North) suggested that two or three years' notice must be given to manufacturers to clear the 'pipeline' of fires designed without guards, many of which were already on the shelves of stores or in warehouses. Existing stocks must take some time to work themselves out even after the Regulations were introduced.

Summing up, Mr. J. K. VAUGHAN-MORGAN (Reigate) observed that this Bill is a triumph for Dr. and Mrs. Colebrook and is the culmination of a long campaign.

Unjustified Innuendoes

Mr. L. W. JOYNSON-HICKS (Parliamentary Secretary to the Ministry of Fuel) criticised Mr. Isaac Pitman (Bath) on March 20 for allegations which Mr. Pitman had made against the South Western Gas Board. He said that Mr. Pitman's charges carried with them implications and innuendoes which were unjustified.

Mr. PITMAN had alleged that the Chairman of the South Western Gas Board had had a £13,500 conveyance carried out by the Board's solicitor free of charge. In addition, conveyances involving £100,000 in property purchase money had been carried out for members of the staff. He did not think that the Chairman should, by subterfuge and devious channels, go round the law and add to his emoluments in this way.

In reply, Mr. JOYNSON-HICKS said the Ministry did not allow Chairmen to get subordinate officers to act for them in their private capacity. When the South Western Gas Board was formed, 15 newly appointed officers came to Bath, and the Board decided that as the only way they could get houses was to buy them, the Board's solicitor should do the legal work. That was a proper business decision for the Board to make and a proper exercise of the solicitor's functions. When the Chairman of the Board wished to leave his house one of his oldest and closest friends, Mr. W. N. Curtis, the Board's Secretary and Solicitor, offered to relieve him of the trouble and worry over the disposal of the property. There was nothing secret or underhand about the matter, and the Law Society itself had given permission to Mr. Curtis to act in that way when he sought its permission.

Gas Manager Gaoled for Coal Thefts

FOR the theft of 350 tons of coal over a period of six years, while he was employed as Manager of Newmilns Gasworks, Hugh McPherson, aged 55, of Gasworks House, Newmilns, was sentenced to 12 months' imprisonment at Kilmarnock Sheriff Court. The Fiscal said accused was appointed Manager of the works by the Town Council in 1936, and when the Gas Board took over he became District Manager.

In October last year, among the papers of a coal merchant were found three receipts for quantities of coal supplied to the merchant by the gas undertaking. Invoices were in McPherson's own handwriting and were receipted by him. He had no authority to sell coal. Enquiries were made and it was learned that from 1945 he had been transferring to two coal merchants in Newmilns wagon loads of coal belonging to the Gas Department. The practice was for him and the merchant to go to the coal lyes, turn the label on the wagon, and substitute the merchant's name. McPherson obtained the wholesale market price for the coal, which averaged about £3 per ton. The total amount involved was approximately £1,050.

On behalf of McPherson, it was stated that these offences had started through a mistaken sense of generosity. During the war, when coal was scarce, two coal merchant friends approached him on the question of obtaining supplies on loan in order to maintain supplies to their customers. Accused agreed, but the merchants found it increasingly difficult to return the coal, and eventually it was suggested that instead of returning it, a payment should be made. He at first refused, but eventually agreed, and it became the natural course. Efficiency of the gasworks did not appear to have been greatly impaired by his action, as no investigations were made by higher authority nor had they ever been considered. In fact, the records of the works were good, the by-products obtained from the manufacture of gas being up to standard. As a result of these offences, accused had been dismissed from his post as Manager, and would lose all benefit under the Board's superannuation scheme.

Sheriff G. W. I. Cormack Cohen, passing sentence, said he could not overlook the fact that McPherson had abused his position, and that the offences extended over a considerable period of time.

Minor Investiture

LORD DERBY, Lord Lieutenant of Lancashire, held a minor investiture at Knowsley Hall, near Liverpool, on March 10, at which, among other awards, he presented the British Empire Medal to Mr. John M. Walker, an employee

Lord Derby (left) chatting to Mr. Walker at Knowsley Hall.

with 50 years' service of Parkinson and Cowan (Gas Meters), Ltd., at Victory Works, Manchester.

Jock Walker (as he has been known to his friends for half a century) started with the Company at the old Cowan factory in Edinburgh. For many years he was a district committee representative of the Amalgamated Engineering Union and, as such, he was a pillar of strength to his workmates as well as one of the most loyal servants that Parkinson and Cowan have ever known.

S.B.G.I. Golf

The S.B.G.I. Golfing Circle will hold its summer meeting on Monday, May 26, at Roehampton Club, London, S.W.15. Formal notices and entry forms will be sent to members.

The competition for the Coronation Plate (played for by members of the Institution of Gas Engineers) will also take place at this meeting and intending competitors should apply for entry forms to the Hon. Secretary of the S.B.G.I. Golfing Circle (Mr. W. Morland Fox, 28, Victoria Street, London, S.W.1.), as these will not, as in former years, be issued with the notices for the annual meeting of the Institution.

An Interesting Experiment is being carried out by the Clyde Lighthouses Trust to determine the scope and value of propane gas as a fuel for lighthouse purposes. The Trust has authorised expenditure to allow preliminary tests on the use of propane gas for lighting buoys. Considerable work has been done in this field in Holland, and the Engineer and Master of Works recently visited installations there to report on the possibilities. The visit was sufficiently successful to justify the experiments now launched. Mobile gas has been used periodically for quay lighthouse and guiding light purposes where town gas has not been available. It has also been used for riding lights on towed objects and for similar purposes but normally in cylinders.

Gas Cooking Costs at King's Lynn

Results of Eastern Gas Board Tests

PRESIDING at a meeting of the Eastern Gas Consultative Council at the Connaught Rooms, London, on March 17, Alderman R. TURNER gave a summary of the proceedings at a meeting of chairmen of consultative councils with the Minister of Fuel and Power in January. Mr. Geoffrey Lloyd had, he said, continued the practice established by Mr. Philip Noel Baker of meeting the chairmen periodically, but the official report of the meeting was marked 'Private and confidential' and he could therefore only give brief extracts. Members of the Council suggested that some effort should be made to remove the restriction implied by the 'confidential' marking of the report, but others deemed it better to let matters remain as they stood lest, in view of possible wide publicity, the Ministry held back information that might be of value to the councils in general.

Equalisation Fund Suggested

All the chairmen had given an account of their stewardship, said Mr. Turner. So far as the Eastern Council was concerned, they had had a very busy year, particularly in considering the Board's new tariffs. The Board had taken over some 100 undertakings, with 446 different tariffs, and only two-thirds of the undertakings were paying their way at vesting date. The number of tariffs had been reduced to six. Attention had been given to freedom of choice and competition between gas and electricity, and in the case of King's Lynn the local council had raised objection to paying the basic fee of £4 for installing gas in new houses, thereby greatly reducing freedom of choice. Among other suggestions put forward at the meeting was one advocating an equalisation fund for interest charges for the gas industry.

Interesting reports were made by chairmen of other councils; for instance, the East Midlands had introduced six zones, with only five tariffs, and the North Eastern Board had reduced the number of zones to three. The Chairman of the Scottish Consultative Council had said it was significant that where consumers were given freedom of choice gas scored every time. At Aberdeen 362 out of 402 new house tenants had chosen gas for cooking.

Power of Entry

The meeting had discussed power of entry and the chairmen were given to understand that some amendment to the legislation would be forthcoming shortly. The Parliamentary Secretary of the Ministry of Fuel and Power had told the meeting that he had learnt a great deal and he appreciated the wealth of voluntary help that went into the work of the consultative councils which, he felt, deserved support.

On the question of tariffs the Southern Council had opposed a special bread baking tariff on the ground that such a tariff would give undue preference, but he (Mr. Turner) had urged that it had been an almost traditional business for a great number of years. Alderman Hoy, of the Northern Council, had raised an important question regarding coal and had contended that the gas industry was being unfairly treated in having been called upon to pay a greater increase than other consumers. A representative of the National Coal Board had stated that the increases were on a qualitative basis; the industry was getting the best coal and must pay a higher price for it.

An Old Old Story

The Chairman reported on correspondence with the Town Clerk of King's Lynn regarding criticisms of the cost of gas for cooking. Freedom of choice, he had pointed out in a letter to the Town Clerk, was possible only when gas and electricity were made available to tenants, and economically it was better to do so at the outset rather than to wait until estates had been developed. If electricity could be provided more economically than gas at a given time, there was no guarantee that it would always be advantageous if there was no healthy competition from gas.

Later in the meeting a report of a special meeting of the Norwich Divisional Committee was presented. The meeting had been held at the request of the Eastern Gas Board, who wished to make a statement with regard to gas charges at King's Lynn as it had been stated in the Press and elsewhere that it cost 1s. to cook a dinner at King's Lynn. The Board had carried out eight tests on various types of cookers in use at King's Lynn and it was found that the cost to cook a dinner for four persons varied from 4.032d. to 5.76d. The cooking was carried out by the housewives in their own homes using their own cookers under normal working conditions. The Board felt that costs stated by Miss M. L. Keith, Housing Manager of King's Lynn and a member of the Consultative Council, were greatly exaggerated.

32,000 Black Cookers

As none of the tests had been carried out in that part of the town from which complaints had arisen, other tests had been made in that part, showing costs for cooking a meal for six persons in excess of those in the original tests. When the tests were repeated in a modern cooker the figure was halved. It was pointed out that many cookers in the town were antiquated and the committee recommended that they should be changed for more modern appliances. Mention was made of the fact that the Board had scrapped 32,000 black cookers last year, thereby saving some 10,000 tons of coal.

The divisional committee's report recorded that Alderman Turner had said that the story that it cost 1s. to cook a dinner was as old as the hills; he had heard it before when gas was much cheaper than it was today. He felt something must be wrong, for it had never cost that amount to cook a dinner. He noted that Miss Keith had used 100 cu.ft. of gas to cook her dinner and he felt she was very extravagant. In his days in the gas industry many tests were carried out in public to show that a dinner could be cooked by 25 cu.ft. of gas.

National Fuel Policy

Minutes of other divisional committees referred to competition between gas and electricity and the preservation of freedom of choice. These matters were discussed at some length and it was urged that the two industries should get together and arrive at some satisfactory arrangement for promoting fuel economy. One member, interested in solid fuel appliances, considered that the time had arrived when a national fuel policy should be determined.

The Council expressed the wish that the matter could be settled and awaited with interest the findings of the Ridley Committee.

Arising out of a resolution at a previous meeting asking for a uniform price of coal for the gas industry, the Council received a report of a question asked in Parliament. Although appreciating the answer, which was in the negative, the Council was still of the opinion that further consideration should be given to its request, seeing that both the coal industry and the gas industry had been nationalised. The high price of coal in the Eastern area was an obstacle to the production of cheap gas and the industry was finding it difficult to compete with electricity which, it was alleged, was receiving more favourable terms.

Stability

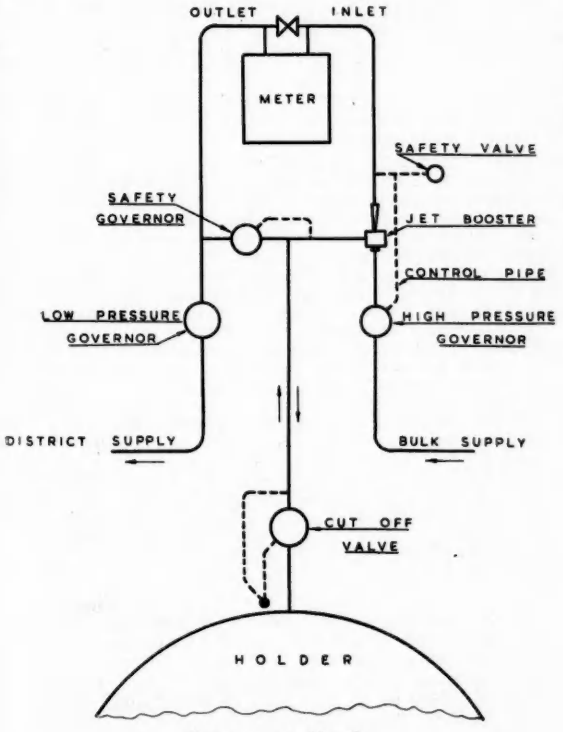
At its January meeting the Council expressed its desire that there should be a period of stability of at least six months before the price of gas was raised again, although it was aware that the Board was facing increased costs and was contemplating further increases in the price of gas. The Chairman stated that the Board had promised seriously to consider the Council's resolution, adding that any matter affecting price was always given the most serious consideration. The Board had no surplus income to absorb rising costs and the prospect of a heavy deficit was disturbing. It had, however, decided to defer consideration of revisions in prices until July, subject to there being no serious rise in costs in the meantime.

The **Quasi-Arc Co., Ltd., Bilston, Staffordshire,** announce that as from April 1, 1952, sales and service of Unionmelt automatic welding plant, powder and wire will be transferred to their associated company, **Fusarc, Ltd., Team Valley, Gateshead-on-Tyne, 11.**

Jet Booster Applied to Automatic Holder Station

By F. T. BUIST, Assoc.M.I.Mech.E.. Assoc.M.Inst.Gas E.,
Distributing Engineer, Kent Suburban Division, South Eastern Gas Board.

THE increasing use of high pressure mains for bulk supply to holder stations and for meeting peak demands on the district raises the question of whether some use can be made of any potential energy from the compression of the gas remaining at the point of delivery. When a pipeline supplies more than one governor or

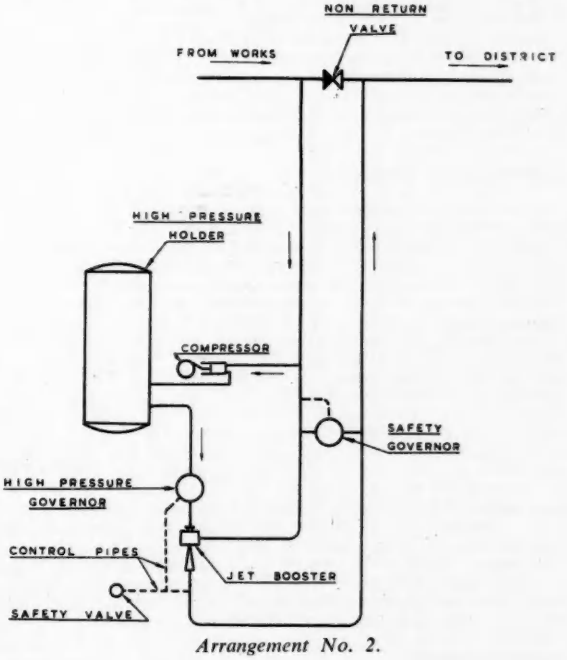


Arrangement No. 1.

holder station, those nearer the compressors will, of necessity, be receiving gas at a relatively high pressure, which will be dissipated by throttling through the governor valves. In some cases it would be possible to use this surplus energy to step up the pressure in a low pressure main or to increase the pressure thrown by a holder. An installation on these lines has recently been put into service at Westerham which not only makes it a completely automatic holder station but does so without introducing mechanical boosting with the necessary prime movers.

The conversion was carried out as shown in Arrangement No. 1. Gas from the 4-in. diameter bulk supply main is fed through a high pressure outlet governor to supply a jet. This jet is followed by a venturi tube, an 8-in. diameter main from the holder being connected on the venturi throat. The mixed gas is controlled at 12 in. W.G. pressure by the high pressure governor and passes through a meter and a further governor to the district. At high output rates, gas is drawn automatically from the holder, boosted to 12 in. W.G. by the jet, and supplied to the district governor. The holder gives a pressure of 5 in. W.G. and the district requires a maximum pressure of 10 in. W.G. At lower rates of flow, the reduced differential causes the pressure in the venturi throat to rise above holder pressure, thus causing gas to flow back into the holder. When the high pressure bulk supply is shut down for the night, the holder supplies gas through the venturi tube and meter to the district. A safety governor is arranged between the district main and venturi intake to open at 4 in. W.G. as a protection for the holder if grounding occurs or if the 8-in. main is fractured and thus admits air. The holder is fitted with the usual cut-off valve, pressure control type. The rate of losing or gaining stock may be adjusted by altering the high pressure governor setting, although it has not been found necessary to alter this setting since the installation of the plant in October, 1951.

A further application is under review with the object of reducing the output of a high pressure storage station. In this case, five cylindrical containers store gas at 60 lb. per sq. in. maximum pressure. When conditions in the district main permit, the holders are filled by a small gas compressor and supply gas through a Reynolds governor to the district at peak periods. The demand for gas in



Arrangement No. 2.

the district has increased so that it is now necessary to work a pressure of 9 in. W.G. for the Sunday peak demand on the outlet of the governor of the storage station. Against this pressure, the low pressure supply main can deliver no gas and so the whole load must be carried by

(*Concluded on p. 768.*)

Gas Industry in France

—By ASHTON

A selection from the French Technical Press

THE most interesting item of news in the current issue of the French Gas Journal is that of the new convention between the electricity and gas industries. Coming into force on January 1, the new convention is completed by a financial agreement which will constitute the basis of the relations between the two nationalised industries. It replaces the convention of 1946. That convention stipulated that the two industries should carry out by each of their own services and as it concerned each of them the activities confided to them by law; to this is now added that certain services may be organised and exploited in common when that would result in an improvement in administration. In particular the two industries recognise the advantage of a common 'service of personnel' and of the mixed distribution of electricity and gas functioning under the same central service of distribution.

The general policy to be followed is set out in Article 6 which definitely lays down that each industry, while retaining liberty of action in its own sphere, will take no decision liable to impinge on the economy of the other until the matter has been discussed by the two industries together.

This engagement is particularly important from the commercial point of view. To ensure that neither of the two industries shall institute, for similar uses of gas and electricity, tariffs inferior to the real cost price of each, and to regulate the procedure of possible substitution of one form of energy for the other, the Committee for the Co-ordination of Gas and Electricity is to be compulsorily consulted.

The financial agreement regulates the audit of accounts between Electricité de France and Gaz de France, fixes the apportionment of common charges and in particular those of indemnification fixed henceforward at 14% for Gaz de France and 86% for Electricité de France.

From January 1, 1952, Gaz de France will possess its own financial department and assume entire responsibility for its own finances, subject to the condition that the centres of mixed distribution will retain their own account though payments will be subject to day-to-day discussion between the two industries.

Gas Industry Statistics

The Editor comments upon the statistics of the industry for 1950 which were published recently. A full discussion by M. Dury is promised shortly but the Editor deals briefly with some outstanding points. Sales of gas rose to 2,648 mill. cu.m. (say 93,500 mill. cu.ft.) of which 2,483 were sold by Gaz de France, 134 by certain municipalities, and 30.5 by undertakings not nationalised. Consumption per consumer averaged 513 cu.m. (18,116 cu.ft.) which is still small compared with some other countries, England for example. Later, commenting on the second report of the British Gas Council, he mentions that in Britain this figure is 1,200 cu.m. reduced to 4,200 calories. It is noted too that nearly 70 mill cu.m. of natural gas is utilised by the gas industry in France, small in comparison with certain other countries but far from negligible; it is equivalent to 150 mill. cu.m. (say 5,300 mill. cu.ft.) reduced to the standard calorific value. It is not impossible that the figure may be substantially increased some day. The discovery of a new and considerable source of gas and perhaps of petrol made recently at Lacq gives grounds for certain hopes which would be a veritable godsend to a country whose subsoil is relatively poor in coal and which might thus find itself in a position of equality with those richer in this respect, England in particular.

Georges Reclus

'The French Gas Industry is in mourning; Georges Reclus is no more.' The January *Journal des Usines à Gaz* carries a biographical sketch of this great figure of the industry, who was born at Limoges in 1888 and whose obsequies took place in Paris on December 19 in the presence of a distinguished gathering, among whom were noted M. Brabant, President of the International Gas Union, and the principal personalities of Gaz de France and Electricité de France, together with officials of all grades of the former Cie. du Gaz de Paris anxious to render a last homage to the memory of their former Chief.

After obtaining his engineer's diploma M. Reclus commenced in February 1913, with Ste. du Gaz de Paris, a distinguished career interrupted twice by war. He rose to the position of Engineer-in-Chief of the Central Service of Consumers in 1933 and four years later to that of Director of Exterior Services (Supply). During the occupation he kept his position, saving from exile and forced labour many of his staff. Some months after the liberation in November, 1944, he accepted at a difficult moment and not without hesitation the delicate functions of Provisional Administrator of the Cie. du Gaz de Paris. On April 8, 1946, the nationalisation of the gas and electricity industries having been voted in the National Assembly, Georges Reclus was placed as President-Director General at the head of Gaz de France, and to him was confided during nearly three years the difficult mission of the initial organisation. Nominated Honorary President in 1949 he continued to represent Gaz de France and Electricité de France in the Economic Council.

Elected to the Committee of the Association Technique de l'Industrie du Gaz en France (the French equivalent of the Institution of Gas Engineers) he became chairman in 1936 of the Commission de Vulgarisation et des Applications, with particular interest in the stamping of approved appliances. In June, 1939, he was elected President of the Association Technique and he exercised his presidential functions, notwithstanding the war, until 1943—that is to say, two years more than was customary—with his usual distinction and with complete success in spite of the difficulties of the times. President of the Ste. for the Development of the Gas Industry in France since 1940, he contributed personally to improving existing collaboration with the constructors of household appliances for whom he succeeded in obtaining membership of Administrative Council thus securing their effective association with gas propaganda.

Vice-President of the International Gas Union, Georges Reclus won the regard of his foreign colleagues. Entrusted, as rapporteur, with the comparison of the different national regulations with regard to the stamping of approved appliances he participated actively in the Congress of Zurich (1934) and of Paris (1937). At the Congress of London (1949) he presided with distinction over one of the working sessions.

He was appointed Chevalier of the Legion d'Honneur on the occasion of the International Exhibition of 1937 and promoted Officier on January 10, 1947, in recognition of his services to the gas industry.

Cool and reserved in temperament Georges Reclus was devoted to duty, but he was also a man of feeling and refinement, a staunch friend (*un homme de coeur, un esprit fin, et un ami sûr*).

Sulphate Manufacture In Coke Oven Plant

M. W. Boulin investigated this subject on behalf of Gaz de France. The three principal methods in use in the carbonising industries are the direct, the indirect, and the semi-direct. By the direct method ammonia is recovered from the gas by washing with water. A more or less concentrated solution is obtained which gives off on distillation gaseous ammonia which is fed to a saturator containing sulphuric acid at a suitable concentration to obtain the sulphate. In the direct process, the gas is cooled to a temperature chosen to condense the major portion of the tar while leaving the volatile ammonia in the gas which passes to the saturator to form sulphate with the acid.

The semi-direct process is a compromise between the two. The gas is cooled completely to throw down the ammoniacal liquor. This is distilled as in the indirect process and the recovered gaseous ammonia is returned to the cooled gas which then passes to the saturator to obtain the sulphate.

M. Boulin examines the reasons which determine the choice of one or other of these processes, taking into account improvements rendered possible by present-day knowledge.

(*Continued on p. 767*)

At first sight the essential difference between the several processes lies in the greater or less quantity of ammoniacal liquor produced and consequently the steam consumption in distillation. On this basis it might appear that the direct process would be the most economical and the indirect the most costly. In reality the problem is more complex and the conclusion different.

Today the direct process has been abandoned. Hot condensation presents serious difficulties. It is necessary to stop at a temperature such that the ammonia does not re-dissolve in the condensed water and to reduce to the minimum the quantity of this water, generally at a temperature above 60° to 70°C. At this temperature the tar is not thoroughly condensed, a notable part of the naphthalene remains in the gas, and the gas remains heavily saturated with water. The acid bath must be kept pretty hot to avoid dilution. These conditions are not favourable to the cheap production of good quality sulphate. M. Boulin does not think these difficulties will be overcome, and his opinion is shared by the principal constructors. One could by electrical precipitation reduce the total quantity of tar while leaving all the ammonia in the gas. But the tar acts as a protective agent in the apparatus and corrosion of iron and even of lead in this process is always to be feared. The use of special steels is very costly.

Semi-Direct Process

The semi-direct process is today almost universally adopted in the majority of coke oven plants. The gas is cooled and completely relieved of water and tar at a temperature not exceeding 20°-25°. Under these conditions a considerable proportion of volatile ammonia dissolves in the condensed liquor which also retains all the fixed salts. These liquors are distilled entraining as little as possible of the water vapour and the ammonia thus separated is returned to the cooled gas which is then passed, either still cold or slightly reheated, to the saturator. Recovery of the ammonia of the fixed salts is almost completely abandoned. The ruling price of sulphate no longer justifies the cost of the necessary liming and distillation in a special column.

The possibility of recovering ammonia by recycling liquor in the hydraulic main had been noted since 1924 by M. Boulin. He found that although this process had received the attention of some constructors and had been patented it was little known among operators. He proceeds to discuss details of the process. It is shown that it is easy to obtain the same advantages as those hoped for in direct recovery. It is necessary, however, to work with a modern design of carbonising plant with hydraulic mains designed for liquor spraying and to give up the use of lime to extract the fixed salts, which is not a paying proposition unless alkaline residues are available.

It is concluded that, particularly in the case of certain gas-making ovens, the employment of the indirect method is justified. Further improvements are possible; in particular the steam consumption can be considerably reduced. Suggestions put forward by M. Bolzinger show that it is possible to raise the ammonia content of washing liquors from 10 to 90 grammes. There is also the point that the use of the waste-heat boiler reduces the importance of steam consumption. The indirect process has the advantage of producing concentrated liquors which can be used in ways other than the manufacture of sulphate. Finally, in the case of the gas-making oven washing with water facilities to some extent the purification of the gas and presents a flexibility in the presence of large variations in gas output to which the semi-direct process accommodates itself less easily.

Industrial Furnaces : Radiant Tube Heating

Three solutions are offered to the problem of heat treatment in controlled atmospheres. Muffles with solid, liquid, or gaseous fuels; electricity; radiant tubes with gaseous fuels.

The muffle requires a low permeability in its walls necessitating the use of costly special steels. Further the muffle is associated with a low thermal efficiency especially at high temperatures and its construction is difficult when its dimensions are considerable. The use of electricity realises a higher thermal efficiency, it conduces to a high facility of control and the possibility of obtaining a good distribution of temperature, but it suffers from the two defects of a poor life of resistances in some atmospheres and a high cost. The relatively recent radiant tube, at least for temperatures above 700°C., has the qualities of the two previous methods without their defects, notably as regards cost of construction and cost of operation. M. Prévot, Chief of Industrial Physics of the Research Department of Gaz de France, analyses in the January *Journal des Usines à Gaz*, the details of this system of heating.

The problem consists in designing for the burning in a tube of a combustible mixture of gas and air. Two methods may be adopted—(a) combustion with preliminary mixing of air and gas, (b) combustion in a diffusion flame, the mixture of air and gas taking place in the tube, and over a considerable length of the tube. In the first the flame is short and very hot near the burner. In the second the air and gas are introduced in parallel streams, combustion is effected with a flame much less hot and which is propagated over a long distance, realising a good distribution of the temperature throughout the length of the tube. Some makers abroad adopt the first method, others the second, and this has been definitely adopted by M. Prévot's department after trials in tubes of the two methods of combustion.

The trials are discussed at length. They were carried out in tubes of ordinary commercial steel in the form of hairpin bends with tubes of four diameters ranging from 95-104 mm. to 40-49 mm. The burner consists of three concentric tubes, air entering by the outer annulus, gas by the next. Lighting is effected by the centre tube. Gas and air are supplied to the burner at low pressures, of the order of 150 mm. water gauge. The burner and pressure regulator are described with diagrams. The results are expressed in graphs. In practice the tubes are arranged in groups in the interior of the furnace. In a trial with a furnace equipped with two 95-104 mm. tubes after five hours of working, the loss by way of products of combustion in terms of net calorific value of the gas was found to be 37%, the mean temperature of the furnaces was about 945°C., and that on the tubes was 1,000°C. In these conditions for a supply of 95,000 calories (net) at the burners the heat dissipated by the tubes per hour is 60,000 calories corresponding to the transmission of heat per square metre of external tube surface of 25,000 calories per hour.

Unitary Calorific Capacity

M. Prévot's paper is continued in the February issue. 'Unitary calorific capacity' is the term applied to the maximum quantity of gas which can be burned correctly per unit volume of the tube per hour. It is shown to diminish as the diameter of the tube increases. Figures are tabulated. Transmission of heat to the interior of the furnace follows Stephan's law. The constant was ascertained experimentally and found to be sufficiently uniform for use in design. Transmission from the gases to the interior of the tubes was more difficult to calculate on account of the impossibility of knowing the manner of flow of the gases, the difficulty of determining accurately the temperature of the gases, and the variations in the composition of the burning gases at different points along the tubes. But experiments were made with thermocouples at different points and the results tabulated. It appears that a tube temperature of 900°C. corresponded to a temperature of 1,350°C. of the gases circulating in the tube.

The high temperature prevailing in the interior of the tubes presented a problem in the construction of helicoidal baffles. Special refractory cast iron, steels with a high nickel-chromium content, refractory materials, and fused alumina were materials which resist the action of the flames.

The cost of construction of the tube-heated furnace compared with that of a muffle, on the basis of weight of steel required, shows an economy of 50% in favour of the former.

These investigations established the advantage of heating by means of radiant tubes at a high temperature, whether for furnaces in which the pieces to be heated must be kept out of contact with the gases of combustion or those in which an atmosphere of known and controlled composition must be kept. The tubes can be arranged in the furnace to obtain the best equality of temperature throughout, presenting a certain analogy with electrical heating but at a lower cost. This system permits the use of gas and air at relatively low pressures with silent operation, easy of regulation. Automatic control and constant conditions within the furnace are readily achieved.

Compared with the muffle furnace the temperature of the products of combustion in a tube correctly constructed is inferior or at most equal to that of the furnace interior, whereas with the muffle it is always superior by 50° to 100°C. Further the method can be applied to immersed tubes

enabling liquids to be heated with great economy. The method is limited only by the nature of the materials available. With steels at present available the limit is about 1,000°C., but heat treatment in a furnace at 1,250°C. is contemplated with fused alumina substituted for steel. The principal results of the investigation are tabulated.

Respirators in the Gas Industry

M. J. Alberny discusses three types of respirator which may be used by workmen in gas contaminated atmospheres—masks with means for the supply of pure air from the outside, masks with an independent portable supply of compressed air, masks with filters.

For work on mains (*i.e.*, in open situations) the first type (type Fernez) is recommended, with a rubber-canvas tube 30 mm. internal diameter and not more than 10 m. long. The mask should be fitted with eye-pieces (lunettes) with de-misting discs. For work in enclosures where escapes of gas have taken place, where the distance for the transmission of air is too great, or where the supply might interfere with the workman's movements, the second type is recommended as used by the Paris Fire Brigade. There are two designs. The first is equipped with two bottles of compressed air of capacity sufficient to last 30 min. to one hour with an automatic warning whistle to indicate the approach of the danger limit. The whole apparatus carried by the workman weighs from 11 to 13 kg. In the second design the air to be breathed is contained in a bag at about atmospheric pressure carried on the back of the workman. The expired air is purified and returned. To compensate for loss of oxygen the apparatus includes a bottle of compressed oxygen or an oxygen generator. The weight of various makes of this type is very variable, the lightest only 3 to 4 kg., others of greater capacity may weigh 16 kg. The filter type of mask is described in several variations but not recommended. The discussion includes recommendations for the use, maintenance, cleaning, and disinfection of the several types and parts of the apparatus.

Natural Gas

The lay press made much of the eruption of natural gas which took place on December 18 at Lacq in the Lower Pyrenees where the Ste. Nationale des Pétroles d'Aquitaine is exploiting a deposit of petroleum and pursuing its searches in the neighbourhood. Few details are given but information received shows that beyond the strata now being exploited, where petroleum has been found at 600 or 800 m., borings have been carried deeper, and it is towards 3,500 m. that the gas was discovered. It escaped with such pressure as to overcome the precautionary measures taken against eruption. A mass of inflammable gas spread over the surrounding region necessitating very extensive safety measures such as the evacuation of some dwellings and the stoppage of traffic upon the arterial road and railway between Bayonne and Pau. After some days the situation was got in hand, the gas burned at the torch and all danger was at an end.

It seems that this was not a case, as at Saint-Marcet, of almost pure methane but of a mixture containing only 75% methane with a fairly high proportion of sulphuretted hydrogen and carbon dioxide. It is premature to draw conclusions from this discovery, but the importance of the Lacq region from the point of view of petroleum supply is confirmed, and the development of production towards petrol or towards gas in the fuel situation of the South West may undergo important modifications.

FUEL RESEARCH, 1949-50

THE last report of the Fuel Research Board was for 1946-49, and dealt largely with the transition from short-term wartime researches to post-war reconstruction projects. A new report now published covers the period April 1, 1949, to December 31, 1950, and paves the way for the resumption of the pre-war practice of presenting reports annually. The report is available from H.M. Stationery Office, price 2s. 6d. (by post, 2s. 8d.).

During the 21 months covered by the report some increase in the accommodation and facilities at the Fuel Research Station was effected by the erection of temporary laboratories and the re-arrangement of existing buildings, but the difficulties in recruiting staff and obtaining equipment have by no means been overcome.

The main effort has been concentrated on the more efficient use of fuel, and investigations having this object have yielded results which to a growing extent are being applied successfully in industry. Work on the elimination of smoke from hand-fired boilers has been extended to show that the reduction in smoke is accompanied by an increase of efficiency of up to 10%. Since at least 20 mill. tons of coal are burnt annually in Great Britain a saving of 5 to 10% would be a valuable contribution to our fuel economy. The Fuel Research Station smoke-eliminator doors, manufactured by a number of firms, have already been installed on some hundreds of boilers, and efforts are continually being made to extend their use.

Since about 37 mill. tons of coal are used directly for domestic heating in this country, it is clear that some economies in fuel consumption, with increased comfort in our houses, can be effected by the introduction of improved appliances for burning solid fuels. With this in view work on the testing of stoves and grates designed to burn solid fuel with higher efficiency has been continued actively both at the Fuel Research Station and at the Scottish Branch Station at Thorntonhall, near Glasgow. Appliances that pass the specified tests are included in the 'List of Improved Solid Fuel Appliances' which is circulated to local authorities and others concerned with housing. This list, together with a list of rather more elaborate models, is included in a list of 'Recommended Domestic Solid Fuel Appliances' issued by the Coal Utililisation Joint Council.

With the object of conserving as far as possible the reserves of the first-grade coking coal, of which there is a particular shortage, large scale experiments have been put in hand, in collaboration with the National Coal Board, to examine the possibilities of producing satisfactory metallurgical coke by carbonising blends of this first-grade coking coal with other more plentiful coals.

An investigation is in progress at the Fuel Research Station on the combustion of coal to provide the energy for the gas turbine. Experimental work has been undertaken using a 'Vertex' combustion chamber and a 'straight-through' combustion chamber, both designed at the Station.

The Station has for some time studied methods for the removal of sulphur compounds from flue gases, particularly in relation to the gases emitted from electricity generating stations. More recently attention has been directed to a process in which ammoniacal liquor is used and sulphur is recovered, mainly in the form of ammonium sulphate. Promising results obtained in a small pilot plant have led to the decision to erect at the Station a larger plant to deal with 25,000 cu. ft. of flue gas per hour.

JET BOOSTER—(*Concluded from p. 761*).

the holders, instead of only the difference between the peak rate and the average rate. The plan is to overcome the difficulty by fitting a jet booster between the inlet and outlet supplies of the storage station. The arrangement would be generally as shown in the diagram, Arrangement No. 2. The static pressure of the stored gas is converted by the jet to do useful work in boosting the pressure of the district main as well as adding its contribution to the quantity of gas required. The district governor may be provided with an automatic self-loading system, or hand-loaded to relate the outlet pressure to the quantity being delivered. A safety governor is provided to prevent the pressure in the low pressure main being reduced to below a predetermined level.

It appears that the same principle could be applied to a series of holder stations requiring a production rate from a common bulk supply main, a jet booster being used to avoid mechanical boosting from holder to district.

It is recognised that the jet booster has not an efficiency comparable with mechanical boosting, but there are instances where, for some reason or another, high pressure gas must be delivered into a low pressure system. It is in these cases where thought can be given to using a jet boosting system effectively and efficiently.

Some Notes on

Comparisons Between Gas and Electricity

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I SUPPOSE that at every age people say, this is the 'critical' age for our business. From time to time in our own industry this has been the cry but little has been done about it. The inherent quality of gas has seen our predecessors over many a hurdle, but in my view there never was a time when the future was so unpredictable for us. An enlightened and more socially conscious people are now taking an interest in fuel and fuel values. As sales representatives of a public utility that has much to offer by way of smokeless fuels to ease the burden of domestic drudgery and create better standards of comfort for all, we must be able to talk about electricity and other fuels with the same assuredness as we do about gas.

Coal Economy

Electricity is not a fuel in the understood sense of the word, but just a convenient means of transforming energy in the form of coal, wind, or water power, existing at some remote point, and transferring it to another where it is needed. Production from natural sources such as wind and water power is not far advanced in this country and our comparisons must be made essentially on the generation of electricity by coal. In the power station, of the amount of heat in the coal used in the boilers to generate electricity, only approximately 25% is recovered and no other essential products are obtained. In other words, out of 1 ton of coal, about 15 cwt. is wasted. Even this low initial efficiency is worsened by the high transmission losses of frequently 15%, reducing the overall production efficiency to below 20%.

The thermal efficiency of a gasworks presents a very different picture, where the country's basic wealth is concerned. Of the heat put in, 75% is recovered in the form of fuels, together with by-products of far-reaching importance in peace and war. Transmission losses are small compared with those suffered in the electrical grid system.

To produce 1 therm of electricity at a power station 40 lb. of coal is required, while at a gasworks a similar unit of heat in the form of gas and coke can be produced with 15 lb. of coal, and, moreover, 0.08 therm is recoverable in the form of tar, apart from other by-products. The figures take into account appliance efficiency at an average figure of 66% for gas and a theoretical figure of 100% for electricity, which is a comparison somewhat favourable to electricity for many operations.

The qualities of gas and coke, and indeed, electricity, as smokeless fuels should not be overlooked in their contribution to a national economy which can no longer afford the extravangancies of smoking chimneys that emit corrosive and deleterious materials which float down on the fabrics of our houses and buildings.

Coal conservation is, however, an especial claim of the gas industry and, regardless of power station engineers who lay great emphasis on their use of low-grade coal and the possibility of greater use of wind and water generation, the ramifications of our two-fuel industry have made such an impact on our national life that their dissolution cannot be contemplated in the foreseeable future. It it reliably stated that if electricity was used on the same scale per head of population as in the U.S.A. most of our coal output would be absorbed —and, it must be added, in a reckless manner.

Two Main Tariffs

There are two main methods by which a charge is made for current used—the flat rate and the 'all-in' two-part tariff. In the case of the flat rate, a simple charge per unit is made, varying from about 6d. per unit for lighting to about 1½d. per unit for heating and industrial power.

The two-part tariff is the more popular charge for domestic uses and is a powerful instrument in the hands of the opportunist salesman for the extension of business. The tariff consists of a standing charge based on the rateable value, floor area, number of rooms in the house, or the connected load, and a commodity charge of not less than ¼d. for each unit. Industrially, the standing charge is related to the amount of plant the board has to install to supply that consumer's requirements, being proportional to his maximum demand as indicated by a special maximum demand indicator.

The standing charge is fixed so that this figure plus the estimated number of units used for lighting, charged at the unit commodity price, produces a revenue similar to that which would result if the lighting units were charged at a flat rate. This ensures a basic revenue due to lighting, which is almost an unassailable prerogative of the electrical industry. Any additional load connected is charged at the lower price per unit, thus offering an attractive inducement to a potential customer, who, by installing further equipment, is able to buy the extra units at a lower effective price per unit.

It is maintained, only truthfully in part, that the standing charge is a charge levied by the electricity boards as a contribution towards the cost of laying mains and services. This is nevertheless quite sound business and the gas industry must exploit a similar system in order to advance.

Outmoded System

The progression of our business should not be hampered by an outmoded system of charge which, based on a block discount schedule, is too unwieldy for comprehension by the consumer. In the step-rate system an estimation of user is necessary before the effective price can be indicated, involving too much talk about price per therm, although this, it must be admitted, is a more open method of charge in some respects. When all has been said about two-part tariffs, which are especially suited for electric supply though their value is still in question, as a temporary expedient, the block discount system must be framed as an incentive to increase the consumer's use of gas, with a short first step carrying a good discount.

The electrical industry succeeds in netting an average revenue of just over 1½d. per unit for electricity used for lighting, heating, and cooking, and rather over 0.8d. per unit for power. The former figure is largely subsidised by lighting, and the more usual effective price is about 1d. per unit on a two-part tariff, which is about 33⅓% more than the figure of approximately 0.75d. per unit that the consumer thinks he is paying.

Before leaving this section on cost, about which little can be said relating to installation charges, it is necessary to draw attention to the strenuous efforts being made to exclude gas from housing estates by the electricity authorities. Quite a number of cases have been reported recently where a charge of £30 per house has been asked for by the Electricity Authority if gas has been included in the specification. This throws into relief the unstable economics of electric supply, which now endeavours to monopolise the heating, lighting, and cooking loads, the while a continuous supply of current cannot be maintained.

Basic Differences and Considerations

The outstanding advantage of gas must surely be the simplicity of the gas tap, which, with its infinite number of settings, provides infinitely varying heats for many domestic and industrial applications. The tap, served by a fuel of standard heating value, is easily controlled manually and, in addition, a simple device can regulate to a predetermined temperature with little fear of failure.

The release of great quantities of heat over small areas with comparatively cheap equipment is the prerogative of our industry. The provision of a positive means of ventilation, particularly in the case of gas fires, is a most valuable asset to be stressed and largely negatives the inconvenience of flueing. The latter is perhaps the most troublesome aspect of gas appliance installation, but with the development of balanced flue heaters, with which progressive design the South Eastern Gas Board must be notably connected, some amelioration of these problems can be expected.

The cleanliness of gas is sometimes in question, often quite unfairly, and, for cooking purposes, the new smooth white or cream hotplates may be the means of ensuring fairer comparison in this respect. The older types of hotplate, black and knobbly, tended to camouflage dirt and grease for a time until it became burnt on, and then the consumer, in endeavouring to remove the hard baked coating, got the impression that gas was dirty. The electric cooker, with its smooth and light top showing every stain, receives immediate attention by the house-proud wife who 'fears' a neighbour's visit. To others, dirtiness is only undesirable if it can be seen.

It is unfortunately true that, whereas gas should be odourless so that its use fluelessly could be contemplated on a fuller scale with a consequent increase in utilisation efficiency, it is not. It is important that sulphur removal should be pursued energetically, so that no gas with a sulphur content of more than 10 grains per 100 cu.ft. is acceptable for domestic purposes. A lower content than this should be the ultimate aim. In the meanwhile, this standard is a minimum requirement of a fuel that is to face the keenest competition.

With electricity, in order to obtain a variation in heat it is necessary to arrange for additional resistances to be put in or out of circuit. For instance, three heat switches can be provided to give three rates of heating—high, medium and low. When the switch is in the 'high' position two equal heaters are connected in parallel so that the full voltage sends current through each. In the 'medium' position, only one of the heaters is used; thus only half the heat is supplied. In the 'low' position the two heaters are connected in series, so that the potential difference or voltage has to drive the current through double the resistance, resulting in less current being used, to give only half the heat of the 'medium' position. Multi-heat switches are now available having five to ten settings, the top number corresponding to full heat. These solve to a large extent the difficulty of simmering experienced on older types of cooker and effect some economy. The thermal capacity of the boiling plate, however, largely negatives the effect, so that instantaneous response to movement of the switch is not so apparent as with variation of the gas tap.

Constancy of heat input is not as certain as with gas having a constant calorific value and specific gravity, provided there is constant pressure. The constant pressure gas governor is a simple device not cheaply available to the electrical industry and thus even though cuts may not be suffered, voltage fluctuation occurs on a considerable scale. Pressure variation of between 160 and 260 volts is quite frequent on a 230 volt supply, a state of affairs which adversely affects the performance of electrical appliances to a marked degree.

Thermostatic Control

Thermostatic control is being increasingly used on electrical appliances and seems quite satisfactory, except where D.C. mains are encountered. The usual principle is for the circuit to be opened or closed by a mechanical device such as a bi-metal strip, well known to us in the flame failure device and thermostat, which opens and closes contacts according to temperature movement.

What is perhaps a virtue of gas does sometimes prove to be a disadvantage in that appliances continue to work even though pressure conditions are unsatisfactory and the appliances are in a bad state of repair and maladjusted. Electrical appliances on the other hand continue to give nearly 100% service, providing there is a standard voltage, until the element fails or a fuse blows, when immediate attention must be given if the appliance is to continue in use. Some depreciation in efficiency does take place, due to oxidation of elements and movement of heating coils, but generally this is less serious than with gas.

Gas appliances, however, deteriorate gradually in performance, the burners become dirty, the injectors become slightly blocked, the flueways are subject to corrosion, the service pipe becomes partially choked, and so on. This happens usually so slowly, that it is not apparent until perhaps Mrs. Brown visited by an electrical salesman, realises the shortcomings of her gas cooker, which, sadly in need of service, has not received attention by a skilled fitter for over 15 years. The next time the fitter's services will be required will be to disconnect the gas cooker!

Apathy

The apathy of the average consumer, if that is what it is, has to be experienced to be believed, and in this connection reference to one particular instance of this problem in Brighton may not be without interest

Vacuum service cleaning units have been in use for some years with considerable benefit to the undertaking and consumer, and in order to better the service to the consumer it was decided to send out pre-paid reply postcards to consumers in an area where choked services were thought to be a little more prevalent. Of the several hundred sent out only 20% were returned requesting that the service pipe be given the free attention promised by the undertaking. Of these, over 90% were choked and not giving fully satisfactory results. In the remaining percentage of consumers, although some confidence might have been placed in their replies and the position thought quite secure, it was decided that a call upon some of these consumers would be expedient. In fact, this examination revealed that of these latter gas users more than 60% were not able to reproduce the full service that gas alone can give.

It must be added that postcards continued to be returned at the commencement of the winter when the pressure inclines to deteriorate due to a slightly lower mains pressure which, in the event of a clear service, would have had no noticeable effect.

The characteristics of gas and electrical appliances are such that regular maintenance must be given. Indeed it would almost seem that the consumer cannot be relied upon to examine critically his supply condition and is an easy prey to apathy and the toleration of chronic conditions. Herein lies a danger and may well be the most

pertinent reason for the diminution of the cooking load.

The value of such 'Sentinel' service has not escaped the attention of the competitor, as is instanced by the Southern Electricity Board, who, for £1 per annum, maintain a cooker, water heater, and wash-boiler. This scheme, at one time applying to all appliances, is now applicable only to new apparatus purchased from the Board, but it offers a considerable incentive to a prospective consumer to maintain a high standard of efficiency in his electrical equipment.

The introduction of legislation empowering gas boards to inspect installations, before connection of meters or addition to existing house pipes in the same way as the electrical authorities, would go far to eliminate many of the bad installations that now exist. The task of regular servicing of consumer's appliances is not out of proportion to the benefits gained and the initiation of an all-in maintenance service for a small fee is of some importance.

Cooking

For cooking, there is no doubt that electricity has captured public imagination, but an important paragraph in a useful post-war building study 'Heating and Ventilation of Dwellings' on the influence of experience on preferences for cooking fuels is significant. This says that, in the case of electricity, in about half of the cases investigated the preference is not related to actual experience and is possibly due to publicity.

The proportions preferring gas and electricity are as follows:

	Gas	*Electricity*
With experience	85%	49%
Without experience	15%	51%

There is very little difference between the four age-groups (under 30, 30-40, 40-50, over 50) for individual preference.

This is very encouraging but, looking further, it is noticed that criticism is mainly levelled at the dirtiness and expense of gas cooking, whereas electricity is considered to be slow and also expensive.

Reference has already been made to the enamelled hotplates of gas cookers, and, in this connection, the continuance of sales efforts to rid the industry of all black cookers is essential.

In the matter of expense the gas and the electric cookers are equally a target for adverse comment, so that means of improving the efficiency of the gas cooker must be sought, in the absence of any likelihood of a price per therm reduction.

To ensure reasonable efficiency it is essential for specially designed utensils with machined bases ¼-in. thick to be used on the electric hotplate necessitating an outlay of £6 to £7 per set. This should not invariably be taken as a sales point in favour of gas, for the cheapness and unsuitability of utensils used for gas cooking purposes raises doubts as to whether their employment is in the interest of the industry and that, rather than design hotplates for such a heterogeneous collection of ironmongery, consumers should be encouraged to purchase utensils of larger bases with possibly some finning. Such a movement would have to be inspired by the gas boards, as this is a matter that does not seem to have received the attention of manufacturers, with the exception of the turbine kettle. There is an advantage in favour of the gas cooker in the cost of initial outlay, leaving a margin for such expenditure by the consumer.

A great deal has been said in the past about shrinkage tests on meat in the two ovens, and we may rest content that on this score gas is equally as satisfactory as electricity. Modern gas ovens with thermostatic control appear to give every satisfaction.

Restricted Oven

The presence of substantial switchgear by the side of the electric oven has the effect of reducing oven capacity to an appreciable extent. For instance, an electric cooker having overall dimensions of 20¾ in. wide × 19¼ in. deep × 36 in. high has an oven cooking space of 11½ in. × 13¾ in. × 13½ in. A comparable gas cooker with a slightly smaller overall size 19 in. wide × 17½ in. deep × 36 in. high has an oven capacity of 15½ in. × 12½ in. × 14 in.

There are two features of the gas cooker that need especial attention. The author has had some experience with the use of an electric cooker and has noticed that the grill and the provision for plate warming are more satisfactory. The drawbacks of the gas cooker in this respect cannot be appreciated unless the user has experienced a better alternative.

The design of a gas hotplate incorporating a grill burner together with three or four boiling burners presents some difficult combustion problems which result in a compromise to the disadvantage of the grill, and it would be better to divorce this burner from the hotplate as was originally suggested, the author believes, by the late Mr. Dean Chandler. As a separate unit greater attention can be paid to its function than at present, when its inclusion seems to be a necessary but unfortunate complication to the general efficiency.

The plate-rack is almost useless as a plate warmer and certainly cannot be used to keep food warm, so that resort for these purposes has to be made to the oven, a most uneconomical method. The electric cooker, on the other hand, has a satisfactory warming compartment under the hotplate, and modern designs of cooker incorporate a further suitable compartment under the oven. There is only one gas cooker available in this country which has this feature, and that is in the de-luxe class—as if it were a luxury and not an essential for food to be served hot.

Boiling Plates

The boiling plates on an electric cooker are of two main types, the totally enclosed element with a heavy machined cast iron top and the radiant type of lower efficiency, which glows when heated. In the latter, the element is embedded in a heat-resisting steel tube, from which it is suitably insulated by fireclay. This form has certain advantages in so far as speed is concerned and the fact that ordinary utensils can be used, but it is not so easily cleaned and is less efficient when both are compared under ideal conditions.

The usual hotplate arrangement is for two boiling plates, one of which is a fast boiler, and the other a boiler grill combining the function in one element of a boiler and a griller. The griller is placed below the boiling plate in the warming compartment and when the boiler only is in use a deflector plate is placed in position under the element. The deflector is removed when the griller is to be used.

It seems clear that if there is a demand for a four-burner hotplate, as indeed there is, capable of carrying out four separate cooking operations then the limitations of an electric hotplate having only two or three different temperature possibilities are such that more manipulation is necessary to prepare a similar meal. Generally it may then be said of both oven and hotplate that the electric cooker requires more personal attention than the gas cooker.

A new development in electric cooking is interesting and is comparable in its service to that given by ranges of the slow combustion type, being suited particularly for households where a considerable amount of cooking is done and flexibility is inessential. It is worth noting because it provides a means by which the inconvenience of electric 'cuts' can be avoided. The maximum loading of these appliances is usually about 2 kW and the current can be switched to whichever particular com-

ponent is in use. Thus when the grill is in use the current is temporarily cut off from the other part of the cooker, but the insulation and design is such that for the short time the grill is in use there is little apparent variation of temperature in the oven.

The facilities provided by these heat storage cookers may be listed as follows:

1. Simmer plate.
2. Rapid boiling hotplate.
3. Main roasting and baking oven 300° to 500°F.
4. Auxiliary oven 150° to 350°F.
5 Cupboard space or 150°F. oven.
6. Radiant grill.

It is commonly thought that all electric appliances are 100% efficient. This is a fallacy. In fact, an electric hotplate under ideal conditions is about 60% efficient, which is one reason why an electric kettle is an almost essential accessory. Three pints of water on an 8 in. diameter solid plate can be boiled in 9 min., whereas with the kettle 7½ min. only is required. In practice, the kettle, although convenient on account of its portability, is unsatisfactory as the speed of boiling cannot be controlled.

For a comparison in speeds, assuming a high loading on a boiling plate of 2,000 watts, then electricity must be considerably slower, as this rating is only equivalent to about 16 cu.ft. per hr. or approximately two-thirds the normal gas rate of a boiling burner. Efficiencies are given in Appendix 'A.'

Generally it may be said that 20 units of electricity equal to one therm of gas, although this figure is an underestimate if the electric cooker is used by an inexperienced person; for instance, unsatisfactory simmering arrangements result in users placing utensils on the edge of the boiling plate with a consequent reduction in heat transfer and a considerable increase in heat loss.

Space Heating

By comparison with the solid fuel fire, gas and electric fires together fail in their appeal to satisfy what is an essential quality of a heating agent in British homes. The flickering flame creates a focal point beloved by many, although this may restrict the use to which a room can be put by creating a localised heated zone. The electric fire is a particularly lifeless and uninteresting piece of apparatus but, nevertheless, well suited for the heating of small rooms, where its use has caused much embarrassment to the British Electricity Authority in recent years. The electric space heating load has increased by leaps and bounds, largely through the efforts of ironmongers and chain and small electrical stores who display a multitude of types. The 'twisted hot wire' dries the air and gives negligible ventilating effect, but the fire is cheap to buy and can be connected simply by the most inexperienced. Thus, although it gives little real satisfaction, sales continue to mount. In the cost of running there is little to choose between a ventilating gas fire and these unhealthy 'fuggers.'

The discouragement of the flueless room and the reduction of sulphur content in gas will go far to increase the sales of flued and flueless gas fires. The 'life' of the flame, the ventilating effect, and the healthy heat of gas fires are sufficient features in favour of gas and, while among other favourable conditions electric fires carry 100% purchase tax against the 66⅔% by gas fires, strenuous efforts should be made to build up this load.

Types of Electric Heater

The range of electric heaters available includes the following: Convection heaters, in which is sometimes incorporated a fan to assist the circulation of warmed air, and water or oil filled radiators with surface temperatures of about 200°F. having loadings between 1½ and 3 kW. The firebar type of heater, in which coils of wire are mounted in a grooved fireclay support, is rapidly being displaced by the reflector type usually capable of being adjusted so as to project the heat directionally according to need. Generally the latter type, consisting of a fireclay tube on which the wire element is wound, requires more maintenance. Flickering devices are often incorporated to give the appearance of a solid fuel fire. Tubular heaters simulating central heating are made, having a loading of 60 watts per foot with a surface temperature of about 200°F. There seems little to recommend them either on the score of running costs or appearance, and their high surface temperature inclines to create a dry unhealthy atmosphere.

More recently panel heating has been introduced in several forms. One type has a similar form to the gas-fired overhead radiant black emitter with a surface temperature of about 600°F. and loadings of 600 watts per sq. ft. Another consists of cast iron panels with heating elements which are recessed flush with the wall or ceiling. The operating temperatures of about 200°F. cause considerable expansion and contraction and the author has seen several cases where unsightly cracks in walls have resulted from their employment. Finally, elements are sometimes embedded in a suitable thin fabric or backboard which can be attached to walls and ceilings invisibly. The loading is about 20 watts per sq.ft. and the surface temperature 90°F. This seems to be quite ideal, but fails to be competitive in running costs with the gas-fired central heating boiler.

With all forms of electric heating 100% of the energy supplied to the heater is converted into heat, and it is primarily this fact which makes electricity competitive in cost with other fuels basically giving more therms per unit cost.

Water Heating

This is perhaps the most important field of our business in view of the scope for expansion existing in thousands of homes that at present have no, or quite inadequate, water heating facilities. It is therefore not surprising that the electrical industry is on its toes in so far as it is able to accept additional loading. The load is, however, largely off the main peak at 8 to 8.30 a.m. and this is also true of the load in relation to the peak of the gas industry. Every endeavour must be made to secure the major part of this market in order to improve the load factor, summer and winter, and assert the industry's position as a multi-purpose fuel industry.

Gas is eminently suited for the provision of hot water on account of its flexibility, ease of temperature control and power of great heat release through small and inexpensive pipes. Thus, with a wide range of appliances of instantaneous and high and low rate recovery storage types, every problem in water heating can be approached confidently, in the knowledge that the question of flueing may be the only limiting factor.

For quantities of water over 250 gal. per week solid fuel is likely to prove to be cheaper than gas and electricity, but for domestic consumptions of 200 gal. per week and less, the refined fuels usually offer a comparative service.

An examination of the relative cost of heating water by gas and electricity reveals that 21 units of electricity are the equivalent of 1 therm, or with electricity at 0.9d. per unit, gas, not in excess of, say, 1s. 6½d. per therm, is cheaper.

Where are the merits and disadvantages of each of the two protagonists under review? The best source for such information is to be found in Special Report No. 8 in the National Building Studies on 'An Inquiry into Domestic Hot Water Supply in Great Britain,' Part I. The most significant entry concerns 'Satisfaction with Appliances,' and as a result of this enquiry it was found that 89% of households considered the immersion heater to be satisfactory, while instantaneous gas water heaters were found to be the least satisfactory. The complaints with the latter appliances emphasise the need for replacing obsolete apparatus by modern equipment and a more careful consideration of consumers' needs together with further appliance improvements.

Gas storage heaters were the subject

of more favourable criticism representing over 70% satisfaction, and it is clear that the storage heater is not used to the extent that it merits.

The electric immersion heater gives a service that is much appreciated, usually as a summer alternative to a solid fuel boiler, but it has no advantage that cannot be matched by gas, except for the occasional inconvenience caused by the necessity of flue. The gas service has the following merits *vis-a-vis* electricity:

(i) Lower running costs.
(ii) More flexible—*i.e.*, an instantaneous, low or high rate recovery service can be given.
(iii) Able to supply small quantities of hot water shortly after lighting up — *i.e.*, stratification.
(iv) Little maintenance.

The immersion heater, having none of the above features is, however, the subject of simple and comparatively cheap installation. To overcome the difficulty of the provision of small quantities of hot water shortly after switching on, two elements are installed in the tank, a 1 kW unit at the top of the tank and a 2 kW unit at the bottom. This arrangement is, however, more expensive to install, so that if a service in any way comparable to that given by gas is required there is little difference between initial costs. The loadings of these heaters range from 1 to 3 kW for domestic purposes, although heating groups are available industrially up to 36 kW. The 1 kW unit immersion heater takes about 8½ hours to heat a tank of 25 gal. from 50° to 160° and the 3 kW heater just over 4 hours to heat a 40-gal. tank, under ideal conditions.

An answer to the immersion heater must be found. The solution may not be in one appliance or system alone, but by the judicious application of the various methods of heating which are now at our disposal. The author, however, believes that the low rate circulator, coupled to a cylinder or tank with an economy valve, is likely to prove to be the most effective answer. In many cases the circulator can be installed in the airing cupboard providing a highly efficient system, the volume of products being so small that they can be discharged into the roof space.

Immersion heaters are subject to a considerable amount of trouble mainly by reason of scaling up causing over-heating of the element, while modern gas circulators, used in conjunction with a scale reducer, are capable of giving long and trouble-free service.

It is unfortunately true that immersion heaters are being installed in substantial numbers, largely by contractors who have little or no experience of water heating, a fact which has helped to bring further discredit upon these heaters. While purchase tax continues to be imposed, a certain defeatist attitude seems to have depressed our water heating business. The public are quite prepared to pay purchase tax on vacuum cleaners, wireless sets, motor cars, and so on, and there is no reason to believe that they will not do the same on gas-fired water heating which gives a really essential service. The presence of purchase tax in this respect, however unjust it may be, is a challenge to salesmen, who, providing they have the confidence, need not find it an insuperable obstacle.

Home Laundry

At the present time the electrical industry is in a better position to provide full home laundry facilities than the gas industry, as several good electric appliances such as the Bendix and Thor are available; but the cost of these approaches £100, so that they have a comparatively limited market. Further, in common with the Hoover washing machine which sells at just over £31, hot water has to be provided from a separate source. This can be a considerable inconvenience to the consumer, but should the sale of a washing machine be lost to gas for one of these, there is an opportunity of providing hot

Appendix A

Comparative Efficiencies of Gas and Electrical Appliances

Type of Appliance	Efficiency % Gas	Electricity
Cooker, hotplate, open	45-55	55
„ „ closed	—	60[1]
„ oven	5-30	5-30
„ griller	20	15-25
Heaters, space, flueless	90	100
Fires, radiant, flued	50	—
„ radiant and convection flued	65	75
Water heaters, instantaneous	55[2]-80	90
„ „ storage	55[2]-73	70[2]-95
„ „ immersion	—	70[2]-100
Wash-boilers	55	85
Kettle, immersion type	—	90

[1] Current must be switched off before cooking operation is completed.
[2] Effective efficiency.

Appendix B

Average Annual Consumptions (Household of 4)

Use	Gas therms	Electricity kWH	Average Relative cost E/G
Cooker	90[1]	1,500	16½
Kettle	—	200	—
Water Heating: (150 gal. per week)			
Circulator with lagged tank	140	—	—
Immersion heater	—	2,835[2]	20
Multipoint instantaneous	150	—	22
Single point instantaneous	120	—	22
Sink heater	45	1,000	22
Wash boiler	14	300[3]	21
Space Heating:			
Hearth-type fire, living room	240[4]	3,500	15
„ bedroom	30	450	
Portable fire	25	725	29
Iron	50	900	18

The relative cost is given by E/G. For example if for water heating purposes gas is 1s. 5¾d. per therm then electricity must be $\frac{17.75}{20}$ = 0.88d. per unit (effective) to be cheaper.

[1] The figure for a gas cooker inclines to be higher as quantities of water are boiled on the hotplate, whereas with the electric cooker the electric kettle is used. It is likely that 20 kWh is the nearer equivalent to one therm of gas.
[2] One analysis of consumptions shows this figure to be much lower at 1,560 units, and it can only be assumed that the system is so expensive that the usual weekly draw of 150 gal. is not reached.
[3] The figure determined by one electrical authority is 450 units and it must be assumed that a large number of these boilers are used for more than laundry purposes.
[4] These fires have flues.

water services, which should almost invariably be by storage, as a temperature of 160°F. is required during the washing process.

With the Bendix, the minimum hot water requirement is 15 gal. at 160°F. per wash.

The simple hand-agitated washing-machine is meeting a long felt need in many homes most satisfactorily and with a great saving in labour. Gas appliance manufacturers are, however, in the process of producing a washing machine with a mechanically operated agitator similar to certain types produced pre-war. These, although not completely automatic, will provide the service the housewife wants at a figure she can afford, and are capable of installation in any house whether adequate hot water facilities exist or not.

The advantages of refrigeration by gas are almost too well known to be mentioned and their inclusion here is to serve only as a reminder:

(i) Freedom from noise and interference to radio and television.
(ii) No moving parts to wear out.
(iii) Little maintenance required.
(iv) Great reliability.

The electric refrigerator, largely because of an insufficiency of numbers of gas-operated models, is in some demand.

Competition between gas and electricity is necessary to ensure that the best possible service is given to the consumer, providing that such competition is based on a national fuel policy in which neither side is given an advantage to the exclusion of the other.

Electricity as a form of motive power, domestically and industrially, is unrivalled, but for most forms of heating the argument for gas from a national and economic standpoint is overwhelming. Every opportunity should be taken to drive home this point while the country habitually faces coal crises and power stations with low thermal efficiencies aggravate the situation.

At the present time, when the further use of gas and electricity is being discouraged, a welcome 'breathing space' is being given to the electrical industry, and although this must cause us some disappointment by being deprived of the opportunity of keeping up the sales pressure, it must be realised that gas is a fuel that has stood the test of time. The inherent qualities of this fuel are adequate to the needs providing that proper use is made of it.

Much has been done to improve our representation in recent years so that the salesman, now a much better qualified man, takes his place in the vanguard of progress, while the remaining organisation equips him with the needs that simplify his task. Considerable responsibility devolves on those concerned to produce a better and cheaper gas and more efficient and attractive appliances backed by adequate servicing. The standard of installation work must also be improved to present gas service as unobtrusively as possible.

Gas, having no monopoly comparable to electric lighting, is in need of an aid to increase sales principally by way of water heating and space heating. This is probably best achieved by the employment of the two-part tariff which has been used so successfully elsewhere. The advantage resulting from the subsidising of other loads through a high commodity charge for electric lighting may be of short duration, as a great extension of the cooking load could unbalance the present economy sending the peak rocketing, and, with it, general charges for current.

Propaganda, of far-reaching importance, is daily being disseminated among the young people by electrical associations, and this calls for an equalising influence in order that youth may get a true perspective of the relative parts played by electricity and gas.

COMPANY NEWS

DOUGLAS

The Douglas (Isle of Man) Gas Light Company is to borrow £15,000 to cover a £50,000 contract for the erection of a new gasholder, now nearing completion. This statement was made by Mr. R. Q. Hampton, Chairman of the Company, at a meeting of shareholders. He stated that the loan, authorised by the Lieut.-Governor of the Island, was necessary to complete the gasholder replacement as the Company's special purposes fund which under the Gas Regulation Act, provided for such exceptional expenditure, could not exceed a total of £35,700. These figures, said Mr. Hampton, were a striking example of the huge cost today of replacing fixed assets and illustrated a permanent transition from old to new values that have to be faced in the present inflationary conditions.

Referring to the working on revenue account, Mr. Hampton said the net result, after deduction of sinking fund allocation, was £9,134. With the carry-forward from 1950 added, less payment of half-year dividend to December that year, there was a disposable balance of £18,234. An interim dividend of 7d. per share, absorbing £4,165, was paid in September and it was now proposed to pay a final dividend for the year of 9.8d. per share, which would absorb £5,831 and leave £8,238 to be carried forward.

DUBLIN

The accounts of the Alliance and Dublin Consumers' Gas Company for the year ended December 31, 1951, show a surplus on revenue account of £128,261 (last year £124,645). After providing for interest on debenture stock and income tax, there remains the sum of £67,993, to which must be added £331 for sundry interest net, £5,204 for interest on investments and the sum of £13,358 being the balance brought from last account, making a total of £86,888 (£84,940). From this total is deducted the interim dividend in respect of the half-year ended June 30, 1951, at the rate of 3% actual (same), which absorbed £35,790 net, leaving a balance of £51,097 available for allocation. The directors recommend the payment of a final dividend for the year ended December 31, 1951, on the consolidated ordinary stock of the Company at the rate of 3% actual (same) less income tax, which will absorb £35,790 net, leaving £15,306 to be carried forward.

An extraordinary meeting of the Company will be held after the ordinary annual general meeting for the purpose of approving an application to the Minister for Industry and Commerce for authority to extend the limits within which the Company is authorised to supply gas, and to increase borrowing powers.

LONDONDERRY

Addressing the 76th general meeting of the Londonderry Gaslight Company on March 11, the Chairman (Capt. B. F. McCorkell) reported another successful year. They were in a position to pay the standard dividend of 2½% (making 5% for the year), and to place to the special purposes and renewal funds £996 and £498 respectively, which is all that is permitted in any one year. The Board thought it advisable to transfer £1,000 to taxation reserve, and the balance of £8,787 is carried forward to the profit and loss account. Sales of gas are up by 23 mill. cu.ft. Sales of coke also show an increase, but against this there is a small decrease in revenue from tar and sulphate of ammonia. There was a decrease also in the revenue from benzole of £999, but against this advantage was taken of the present demand for sulphur to dispose of spent oxide containing a high sulphur content to the value of £1,094. A further £8,265 has been spent during the year in laying gas mains to new housing estates and necessary works equipment. The Company is faced with a shortage of working capital (largely due to inflation). No new capital has been issued since 1909, and since then the output of gas has increased from 111 to 350 mill. cu.ft. per annum. It may therefore be necessary to issue additional capital up to a maximum sum of £50,000.

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